

Section 9 of 22 (9e – Nitrogen Fertilizer Guide)

FERTILIZER TYPE	CHEMICAL FORMULA & FERTILIZER GRADE(S):	Pounds of Nitrogen per 100 pounds of fertilizer		% N	% P ₂ O ₅	% K ₂ O
Urea	CO(NH ₂) ₂ 45-0-0 to 46-0-0	45	46	45 to 46	0	0
Ammonium Nitrate	NH ₄ NO ₃ 33-0-0 to 34-0-0	33	34	33 to 34	0	0
URAN (Urea + Ammonium Nitrate)	CO(NH ₂) ₂ & NH ₄ NO ₃ 28-0-0 to 32-0-0	28	32	28 to 32	0	0
Ammonium Sulfate	(NH ₄) ₂ SO ₄ 21-0-0-24S	21		21	0	0
Ammonium Thiosulfate	(NH ₄) ₂ S ₂ O ₃ 12-0-0-26S	12		12	0	0
Monoammonium Phosphate	NH ₄ H ₂ PO ₄ 11-48-0 to 11-52-0	11		11	48 to 52	0
Diammonium Phosphate	(NH ₄) ₂ HPO ₄ 18-46-0 to 21-53-0	18	21	18 to 21	46 to 53	0
Ammonium Polyphosphate	(NH ₄) ₃ HP ₂ O ₇ 10-34-0 to 11-37-0	10	11	10 to 11	34 to 37	0
Calcium Nitrate	Ca(NO ₃) ₂ 15-0-0-24Ca	15		15	0	0
Potassium Nitrate	KNO ₃ 13-0-44	13		13	0	44
Sodium Nitrate	NaNO ₃ 16-0-0	16		16	0	0
Anhydrous Ammonia	NH ₃ 82-0-0	82		82	0	0
Aqua Ammonia	NH ₄ OH 20-0-0 to 25-0-0	20	25	20 to 25	0	0

NOTE: All major soil nitrogen transformations are mediated by various soil microorganisms. Also, the fate of **any** fertilizer nitrogen source will be subject to the following:

- 1) Mineralization: conversion of organic nitrogen to inorganic nitrogen by microorganisms
- 2) Nitrification: conversion of ammonia nitrogen into nitrate
- 3) Denitrification: conversion of nitrate into a nitrogen gas
- 4) Ammonia volatilization: loss of ammonia nitrogen as a gas
- 5) Leaching of nitrates: caused by over-irrigation, especially in sandy soils
- 6) Immobilization: conversion of inorganic nitrogen into an organic form
- 7) Ammonium fixation on certain types of clays

Soil organic matter will mineralize about 20-40 pounds of nitrogen/acre/year. 95% or more of total N in surface soils is present as organic nitrogen. Under normal growing conditions, when soils are warm, moist, and well-aerated ammoniacal nitrogen (i.e., ammonium plus ammonia) converts to nitrate in 2-3 weeks, making nitrate the most abundant inorganic form of nitrogen.

<i>NITROGEN FERTILIZERS</i>	NITROGEN (N) CHEMICAL FORM (i.e., UREA ($\text{CO}(\text{NH}_2)_2$), AMMONIUM ION (NH_4^+), AMMONIA (NH_3), and NITRATE (NO_3^-)); handling properties, and other information:
Urea	N is 100% $\text{CO}(\text{NH}_2)_2$, which converts to ammonia in several days; is hygroscopic; quite soluble; good handling properties.
Ammonium Nitrate	N is 50% NH_4^+ and 50% NO_3^- ; is hygroscopic; highly soluble; explosive if mixed with hydrocarbons (fuel oil); care taken to prevent caking.
URAN (Urea + Ammonium Nitrate)	N is 50% $\text{CO}(\text{NH}_2)_2$, 25% NH_4^+ , and 25% NO_3^- ; nonpressure N solution; ease in handling and application. Can be applied through various irrigation systems.
Ammonium Sulfate	N is 100% NH_4^+ ; S is 100% SO_4^{2-} ; safe and easy to store; quite soluble; low hygroscopicity; solid.
Ammonium Thiosulfate	N is 100% NH_4^+ ; when applied to soil, ammonium thiosulfate forms colloidal S^0 and $(\text{NH}_4)_2\text{SO}_4$; S^0 must be oxidized; is a solution.
Monoammonium Phosphate	N is 100% NH_4^+ ; 11-52-0 is the most common grade for monoammonium phosphate, and 18-46-0 is the most common grade for diammonium phosphate; both are granular & completely water-soluble; more important as a phosphorus source.
Diammonium Phosphate	
Ammonium Polyphosphate	N is 100% NH_4^+ ; 10-34-0 is the most common grade; approximately 75% of P is polyphosphate and 25% is orthophosphate; liquid; easy handling.
Calcium Nitrate	N is 100% NO_3^- ; is highly soluble; strongly hygroscopic. Also provides a readily soluble/available calcium ions.
Potassium Nitrate	N is 100% NO_3^- ; also called salt peter. Also provides a readily soluble/available potassium ions.
Sodium Nitrate	N is 100% NO_3^- ; a naturally mined fertilizer. This is a very soluble fertilizer. Approved for organic farmer registration/ certification.
Anhydrous Ammonia	N is 100% NH_3 ; is a liquid under pressure; must be injected 3 to 8" below the soil surface; stored in pressure tanks; <u>must</u> observe safety precautions.
Aqua Ammonia	N is 100% NH_3 dissolved in water; usually injected in soils 2 to 4" depth; is composed of 25-29% NH_3 by weight; pressure of $< 10 \text{ lb/in}^2$.